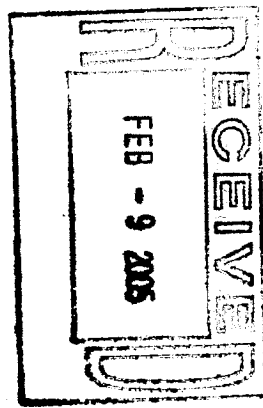


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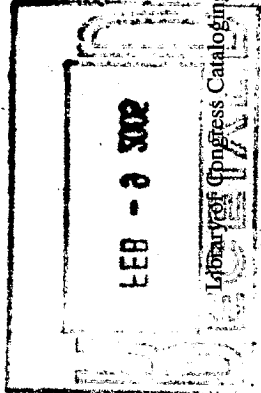
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1. Electric engineering—Dictionaries.
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current amplification

A direct current is a unidirectional current in which the changes in value are either zero or so small that they may be neglected. A given current would be considered a direct current in some applications, but would not necessarily be so considered in other applications. (Std100) 270-1966w

(3) The use of certain adjectives before "current" is often convenient, as in convection current, anode current, electrode current, emission current, etc. The definition of conducting current usually applies in such cases and the meaning of adjectives should be defined in connection with the specific applications. (Std100) 270-1966w

(4) Sum of the polarization and conductance currents. (PE) 402-1974w

current amplification (1) The ratio of the output current to the cathode current due to photoelectric emission at constant electrode voltages. *Notes:* 1. The term output current and photocathode current as here used does not include the dark current. 2. This characteristic is to be measured at levels of operation that will not cause saturation. *See also:* phototube. (ED/NPS) 161-1971w, 398-1972r

(2) **(magnetic amplifier)** The ratio of differential output current to differential control current. (MAG) 107-1964w

(3) The ratio of the signal output current to the current applied to the input. *See also:* amplifier. (ED) [45]

current, anode *See:* electrode current.

current attenuation Either a decrease in signal current magnitude, in transmission from one point to another, or the process thereof, or of a transducer, the scalar ratio of the signal input current to the signal output current. *Note:* By incorrect extension of the term "decibel," this ratio is sometimes expressed in decibels by multiplying its common logarithm by 20. It may be correctly expressed in decibels. *See also:* decibel; attenuation. (SP) 151-1965w

current, average discharge *See:* average discharge current.

current balance ratio The ratio of the metallic-circuit current or noise-metallic (arising as a result of the action of the longitudinal-circuit induction from an exposure on unbalances outside the exposure) to the longitudinal circuit current or noise-longitudinal in sigma at the exposure terminals. It is expressed in microamperes per milliamperes or the equivalent. *See also:* inductive coordination. (BEC/PE) [119]

current-balance relay A balance relay that operates by comparing the magnitudes of two current inputs. (SWG/PE/PSR) C37.100-1992, C37.90-1978s

current-balancing device (thyristor) Device used to achieve satisfactory division of current among parallel connected semiconductor devices, for example, reactor, resistor, inductor. (IA/IPC) 428-1981w

current-balancing reactor A reactor used in semiconductor rectifiers to achieve satisfactory division of current among parallel-connected semiconductor diodes. *See also:* reactor. (PE/TR) [57]

current balancing transformer *See:* sharing transformer and current balancing transformer.

current carrier In a semiconductor, a mobile conduction electron or hole. (AES/SS) 307-1969w

current-carrying *See:* energized.

current-carrying capacity The maximum current that a contact is able to carry continuously or for a specified period of time. *See also:* contactor. (IA/IAC) [60], [84]

current-carrying part A conducting part intended to be connected in an electric circuit to a source of voltage. *Note:* Non-current-carrying parts are those not intended to be so connected. (SWG/NESC/T&D/PE) C2-1997, 516-1995, C37.100-1992, C37.40-1993, C37.30-1971s

current circuit (1) (ac high-voltage circuit breakers) That part of the synthetic test circuit from which the major part of the power frequency current is obtained. (SWG/PE) C37.081-1981r, C37.083-1999

current delay angle

(2) **(relays)** An input circuit to that is applied a voltage or a current which is a measure of primary current. (PE/PSR) C37.90.1-1989r

current clamp (self-commutated converters) (converter circuit elements) A clamp that limits the current through a semiconductor device. (IA/SPC) 936-1987w

current comparator (metering) A device by which the ratio of two currents and the phase angle between them can be measured precisely. *Note:* A common form of current comparator relies on a balance on ampere-turns produced by currents in two or more windings on one or more magnetic cores. (ELM) C12.1-1988

current compensator (excitation systems for synchronous machines) An element of the excitation system that acts to compensate for synchronous machine load current effects. *Notes:* 1. Examples are reactive current compensator and active current compensator. A reactive current compensator is a compensator that acts to modify the regulated voltage in accordance with reactive current. An active current compensator is a compensator that acts to modify the regulated voltage in accordance with active current. 2. Historically, terms such as equalizing reactor and cross current compensator have been used to describe the function of a reactive compensator. These terms are deprecated. 3. Reactive compensators are generally applied with synchronous machine voltage regulators to obtain reactive current sharing among synchronous machines operating in parallel. They function in the following two ways:

a) Reactive droop compensation is the more common method. It creates a droop in synchronous machine terminal voltage proportional to reactive current and equivalent to that which would be produced by the insertion of a reactor between the synchronous machine terminals and the paralleling point.

b) Reactive differential compensation is used where droop in synchronous machine voltage is not wanted. It is obtained by a series differential connection of the various synchronous machine, current transformer secondaries, and reactive compensators. The difference current for any synchronous machine from the common series current creates a compensating voltage in the input to the particular synchronous machine voltage regulator which acts to modify the synchronous machine excitation to reduce to minimum (zero) its differential reactive current.

4. Line drop compensators modify synchronous machine terminal voltage by regulator action to compensate for the impedance drop from the machine terminals to a fixed point in the external circuit. Action is accomplished by insertion of a voltage equivalent to the impedance drop within the regulator input circuit. The voltage drops of the resistance and reactance portions of the impedance are obtained, respectively, by an active compensator and a reactive compensator. (PE/EDPG) 421.1-1986r

current, conduction *See:* conduction current.

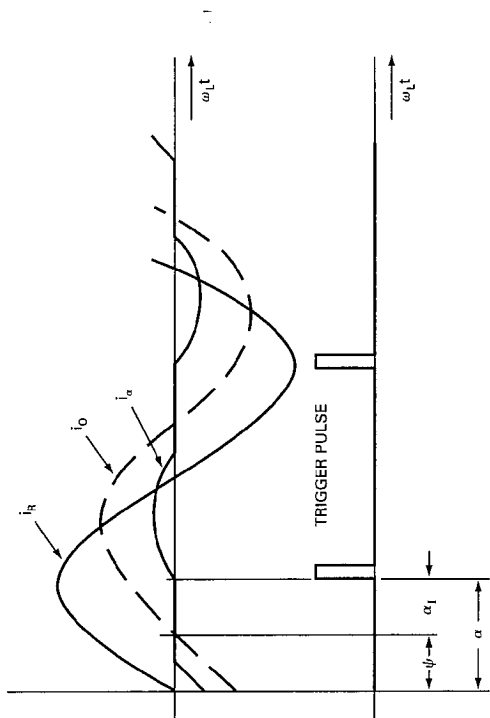
current crest factor The ratio of the peak value of lamp current to the root-mean-square value of lamp current. (EEC/LB) [97]

current cutoff (power supplies) An overload protective mechanism designed into certain regulated power supplies to reduce the load current automatically as the load resistance is reduced. This negative resistance characteristic reduces overload dissipation to negligible proportions and protects sensitive loads. (AP/ANT) [35]

current cycle loop (substation grounding) The combination of conductors and connectors that carries the current of the circuit under test. (SUB/PE) 837-1989r

current delay angle (thyristor) The interval in electrical angular measure by which the starting instant of conduction is delayed in relation to operation that would occur with continuous

current density



i_a = current in a control element with all control elements continuously gated and a resistive load

i_b = current in a single phase controller
 i_0 is in phase with the line voltage. The latter may be used as a convenient reference voltage to measure α

i_0 = current in a control element with all control elements continuously gated and at the specified load

i_0 = current in a control element with a trigger delay angle of α and at the specified load
 α = angle of retard
 α_t = current delay angle
 ψ = angle between i_a and i_0

NOTE: In the case of a single phase controller, ψ is identical with the load power factor angle.

current delay angle

uously gated control elements. See α_t of the corresponding figure.

current density (1) A generic term used where there is no danger of ambiguity to refer either to conduction-current density or to displacement-current density, or to both. (IA/TPC) 428-1981w

(2) A vector-point function describing the magnitude and direction of charge flow per unit area. The preferred unit is amperes per square meter (A/m^2). (T&D/PE) 1227-1990r

current derived voltage A voltage produced by a combination of currents. *Note:* (1) The element used to create this voltage in a pilot system is popularly referred to as a filter. A typical example is a filter that is supplied three-phase currents and produces an output voltage proportional to the symmetrical component content of these currents. (For example, $V_f = K_1 I_{A1} + K_2 I_{A2} + K_0 I_{A0}$ where I_{A1} , I_{A2} , and I_{A0} are the symmetrical components of the A phase current and the K are weighting factors.) (PE/PSR) C37.95-1973s

current differential relay A relay designed to detect faults by measuring the current magnitude and phase angle difference between relay terminals of a transmission line. (PE/PSR) C37.113-1999

current efficiency (specified electrochemical process) The proportion of the current that is effective in carrying out that process in accordance with Faraday's law. *See also:* electrochemistry. (EBC/PE) [119]

current extent *See:* extensional set.

current generator (signal-transmission system) A two-terminal circuit element with a terminal current substantially independent of the voltage between its terminals. *Note:* An ideal current generator has zero internal admittance. *See also:* network analysis; signal. (EID) 161-1971w

current injection method A synthetic test method in which the voltage circuit is applied to the test circuit breaker before power frequency current zero. (SWG/PE) C37.100-1992, C37.083-1999, C37.081-1981r

current instance The package instance whose private data is currently accessible. (C/BA) 1275-1994

current limit (1) The maximum output of the battery charger delivered to a discharged battery and load, usually stated as a percentage of output rating and with nominal input voltage supplied to the charger. (IA/PSE) 602-1996

(2) A control function that prevents a current from exceeding its prescribed limits. *Note:* Current-limit values are usually expressed as percent of rated-load value. If the current-limit circuit permits the limit value to increase somewhat instead of being a single value, it is desirable to provide either a curve of the limit value of current as a function of some variable such as speed or to give limit values at two or more conditions of operation. (IA/APP/IAC) [69], [60]

current-limit acceleration (electric drive) A system of control in which acceleration is so governed that the motor armature current does not exceed an adjustable maximum value. *See also:* electric drive. (IA/JCTL/IAC) [60]

current-limit control (electric drive) A system of control in which acceleration, or retardation, or both, are so governed that the armature current during speed changes does not exceed a predetermined value. *See also:* electric drive. (EEC/PE) [119]

current limiter (protection and coordination of industrial and commercial power systems) A device intended to function only on fault currents of high magnitude and that may not successfully open on lesser overcurrents regardless of time. Such a device should always be used in series with a fuse, contactor, or circuit breaker to protect against overloads and low-level short circuits. Current limiters are typically added to molded-case circuit breakers, power circuit breakers, or instantaneous circuit protectors. (IA/PSP) 242-1986r

current limiting, automatic *See:* automatic current limiting.

current-limiting characteristic curve (of a current-limiting fuse) A curve showing the relationship between the maximum peak current passed by a fuse and the correlated root-mean-square available current magnitudes under specified voltage and circuit impedance conditions. *Synonyms:* peak let-

voice processing Information processing in which the human voice is the data input. *See also:* office automation. (C) 610.2-1987

void volume ratio The volume of the void spaces between stones divided by the total volume occupied by the stones in a stone-filled collecting pit. (SUB/PE) 980-1994

volatile (electronic data processing) Pertaining to a storage device in which data cannot be retained without continuous power dissipation, for example, an acoustic delay line. *Note:* Storage devices or systems employing nonvolatile media may or may not retain data in the event of planned or or accidental power removal. (C/MIL) 162-1963w, [2]

volatile flammable liquid A flammable liquid having a flash point below 38°C (100°F) or whose temperature is above its flash point. (NESC/NEC) [86]

volatile storage A type of storage in which information cannot be retained without continuous power application. *Contrast:* nonvolatile storage. (C) 610.10-1994w

vocas A voice-operated device that switches loss out of the transmitting branch and inserts loss in the receiving branch under control of the subscriber's speech. The name is derived from the initial letters of the expression voice-operated loss control and suppressor. *See also:* voice-frequency telephony. (EEC/PE) [119]

volt (metric practice) (unit of electric potential difference and electromotive force) The difference of electric potential between two points of a conductor carrying a constant current of one ampere, when the power dissipated between these points is equal to one watt. (QUL) 268-1982s

voltage effect *See:* contact potential.

voltage (1) (electromotive force) (general) (along a specified path in an electric field). The dot product line integral of the electric field strength along this path. *Notes:* 1. Voltage is a scalar and therefore has no spatial direction. 2. As here defined, voltage is synonymous with potential difference only in an electrostatic field. 3. In cases in which the choice of the specified path may make a significant difference, the path is taken in an equiphase surface unless otherwise noted. 4. It is often convenient to use an adjective with voltage, for example, phase voltage, electrode voltage, line voltage, etc. The basic definition of voltage applies and the meaning of adjectives should be understood or defined in each particular case. *See also:* reference voltage. (Std100) 270-1966w

(2) (A) (voltage of circuit not effectively grounded) The highest nominal voltage available between any two conductors of the circuit. *Note:* If one circuit is directly connected to and supplied from another circuit of higher voltage (as in the case of an autotransformer), both are considered to be of the higher voltage, unless the circuit of the lower voltage is effectively grounded, in which case its voltage is not determined by the circuit of the higher voltage. Direct connection implies electric connection as distinguished from connection merely through electromagnetic or electrostatic induction. (B) (voltage of a constant current circuit) The highest normal full-load voltage of the current. (C) (voltage of an effectively grounded circuit) The highest nominal voltage available between any conductor of the circuit and ground unless otherwise indicated. (D) The effective (rms) potential difference between any two conductors or between a conductor and ground. Voltages are expressed in nominal values unless otherwise indicated. The nominal voltage of a system or circuit is the value assigned to a system or circuit of a given voltage class for the purpose of convenient designation. The operating voltage of the system may vary above or below this value. (NESC) C2-1997

(3) (**surge arresters**) (electromotive force) The voltage between a part of an electric installation connected to a grounding system and points on the ground at an adequate distance (theoretically at an infinite distance) from any earth electrodes. (PE) [8], [84]

(4) (of a circuit) The greatest root-mean-square (effective) difference of potential between any two conductors of the circuit concerned. Some systems, such as 3-phase 4-wire, single-phase 3-wire, and 3-wire direct-current may have various circuits of various voltages. (NESC/NEC) [86]

voltage amplification (1) An increase in signal voltage magnitude in transmission from one point to another or the process thereof. *See also:* amplifier. (Std100) 270-1966w

(2) (**transducer**) The scalar ratio of the signal output voltage to the signal input voltage. *Warning:* By incorrect extension of the term decibel, this ratio is sometimes expressed in decibels by multiplying its common logarithm by 20. It may be correctly expressed in decibels. *Note:* If the input and/or output power consist of more than one component, such as multifrequency signal or noise, then the particular components used and their weighting must be specified. *See also:* transducer. (Std100) 270-1966w

(3) (**magnetic amplifier**) The ratio of differential output voltage to differential control voltage. (MAG) 107-1964w

voltage and power directional relay (power system device function numbers) A relay that permits or causes the connection of two circuits when the voltage difference between them exceeds a given value in a predetermined direction and causes these two circuits to be disconnected from each other when the power flowing between them exceeds a given value in the opposite direction. (SUB/PE) C37.2-1979s

voltage attenuation (1) (data transmission) An adjustable device for reducing the amplitude of a wave without introducing distortion. An adjustable passive network that reduces the power level of a signal without introducing appreciable distortion. (PE) 599-1985w

(2) (**analog computer**) A device for reducing the amplitude of a signal without introducing appreciable distortion. (C) 165-1977w

voltage at the instant of chopping The voltage at the instant of the initial discontinuity. (PE/PSIM) 4-1995

voltage balance relay A balance relay that operates by comparing the magnitudes of two voltage inputs. (SWG/PE) C37.100-1992

voltage buildup (rotating machinery) The inherent establishment of the excitation current and induced voltage of a generator. (PE) [9]

voltage circuit (1) (A) (ac high-voltage circuit breakers) That part of the synthetic test circuit from which the major part of the test voltage is obtained. (B) An input circuit to which is applied a voltage or a current that is a measure of primary voltage. (SWG/PE) C37.081-1981

(2) (**instrument**) That combination of conductors and windings of the instrument to which is applied the voltage of the circuit in which a given electrical quantity is to be measured, or a definite fraction of that voltage, or a voltage or current dependent upon it. *See also:* moving element; instrument; without meter. (EEC/AID) [102]

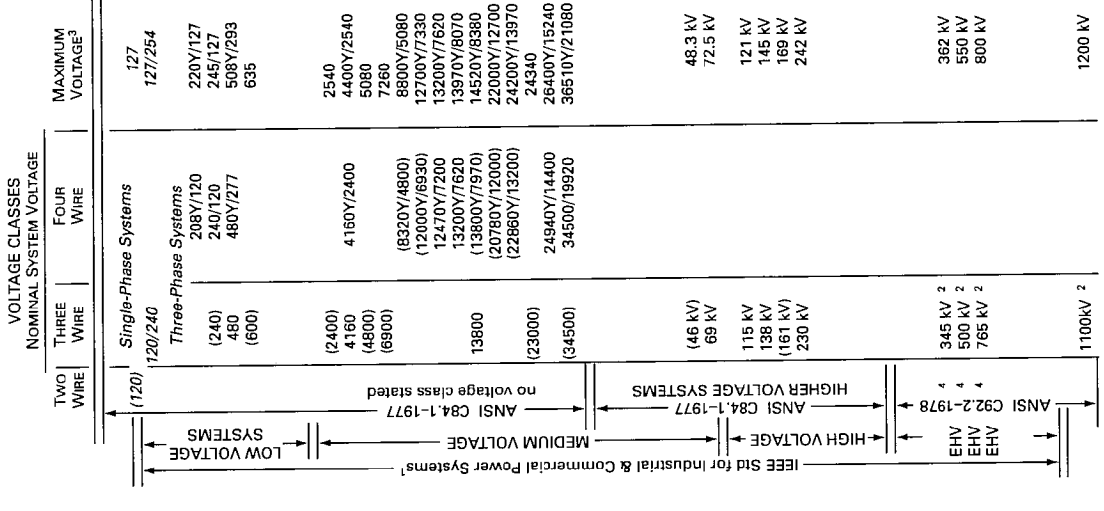
(3) That part of the synthetic test circuit from which the major part of the test voltage is obtained. (SWG/PE) C37.083-1999

voltage clamp (converter circuit elements) (self-commutated converters) A clamp that limits the peak voltage across a semiconductor device. (IA/SPC) 936-1987w

voltage clamping ratio (low voltage varistor surge arresters) A figure of merit measure of the varistor voltage clamping effectiveness as determined by the ratio of clamping voltage to rated root-mean-square (rms) voltage, or by the ratio of clamping voltage to rated direct-current (dc) voltage. (PE) [8]

voltage class *See:* medium-voltage power cable; control cable; low-level analog signal cable; low-level digital signal circuit cable; low-voltage power cable (s).

voltage classes Voltage classes are as shown in the corresponding figure.



(Preferred nominal voltages as shown without parentheses ().
1. Voltage class designations applicable to industrial and commercial power systems, adopted by IEEE Standards Board (LB 100A-April 23, 1975).
2. Typical nominal system voltage.
3. A comprehensive list of minimum and maximum voltage ranges is given in ANSI C84.1-1977.)

voltage classes

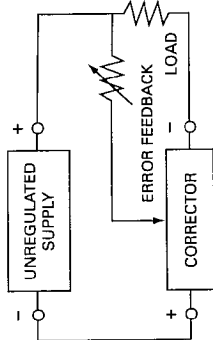
voltage class, rated nominal *See:* rated nominal voltage class.

voltage coefficient of capacitance (nonlinear capacitor) The derivative with respect to voltage of a capacitance characteristic, such as a differential capacitance characteristic or a reversible capacitance characteristic, at a point, divided by the capacitance at that point. *See also:* nonlinear capacitor. (ED) [46]

voltage, common-mode *See:* common-mode voltage.

voltage-controlled oscillator (VCO) An oscillator whose frequency is a function of the voltage of a control signal. (AES) 686-1997

voltage corrector (power supplies) An active source of regulated power placed in series with an unregulated supply to sense changes in the output voltage (or current); also to correct for the changes by automatically varying its own output in the opposite direction, thereby maintaining the total output voltage (or current) constant. (See the corresponding figure.)



Circuit used to sense output voltage changes.

voltage corrector

voltage/current (V/I) characteristic The relationship between the steady-state current of the static var compensator (SVC) and the voltage at its point of connection. (AES/PE) [41], [78]

voltage deviation (A) (self-commutated converters) (converters having ac output) (transient) The instantaneous difference between the actual instantaneous voltage and the corresponding value of the previously undisturbed wave form. *Note:* Voltage deviation amplitude is expressed in percent or per unit referred to the peak value of the previously undisturbed voltage. (B) (electromagnetic site survey) The ratio of the root-mean-squared envelope voltage to the average envelope of a signal expressed in decibels. (IA/EMC/SPC) 936-1987, 473-1985

voltage dip *See:* sag.

voltage directional relay (power system device function numbers) A relay that operates when the voltage across an open circuit breaker or contactor exceeds a given value in a given direction. (SUB/PE) C37.2-1979s

voltage distortion Any deviation from the nominal sine waveform of the ac line voltage.

voltage divider A network consisting of impedance elements connected in series, to which a voltage is applied, and from which one or more voltages can be obtained across any portion of the network. *Notes:* 1. Dividers may have parasitic impedances affecting the response. These impedances are, in general, the series inductance and the capacitance to ground and to neighboring structures at ground or at other potentials. 2. An adjustable voltage divider of the resistance type is frequently referred to as a potentiometer. (PE/PSIM/EM) 4-1978s, 43-1974s, [55]

voltage doubler A voltage multiplier that separately rectifies each half cycle of the applied alternating voltage and adds the two rectified voltages to produce a direct voltage whose amplitude is approximately twice the peak amplitude of the applied alternating voltage. *See also:* rectifier. (EEC/PE) [119]

voltage drop (1) The difference of voltages at the two terminals of a passive impedance. (PE) [9]

(2) (**supply system**) The difference between the voltages at the transmitting and receiving ends of a feeder, main, or service. *Note:* With alternating current, the voltages are not necessarily in phase and hence the voltage drop is not necessarily equal to the algebraic sum of the voltage drops along the several conductors. *See also:* alternating-current distribution. (T&D/PE) [10]

voltage efficiency (specified electrochemical process) The ratio of the equilibrium reaction potential to the bath voltage. (EEC/PE) [119]

voltage endurance (1) (rotating machinery) A characteristic of an insulation system, obtained by plotting voltage against time to failure, for a number of samples tested to destruction at each of several sustained voltages. Constant conditions of frequency, waveform, temperature, mechanical restraint, and ambient atmosphere are required. Ordinate scales of arithmetical or logarithmic voltage, and abscissa scales of multi-cycle logarithmic time, normally give approximately linear characteristics. *See also:* asynchronous machine. (PE) [9]